IRP 81-04

VOL V OF V

VOLUME IV
PROJECT MANAGEMENT, SCHEDULING
AND COSTING
CONTRACT NO:
DAAG49-81-C-0192

IRP 81-04

ASSESSMENT OF ENVIRONMENTAL CONTAMINATION VOL IV, MGMT, SCHED, COST

NOV 1981

Ertec

The Earth Technology Corporation

5 OF 5

THE EXPLORATORY STAGE OF A U.S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY CONTAMINATION SURVEY AT TOOELE ARMY DEPOT, TOOELE, UTAH

VOLUME IV
PROJECT MANAGEMENT, SCHEDULING
AND COSTING
CONTRACT NO:
DAAG49-81-C-0192

SUBMITTED TO
TOOELE ARMY DEPOT
PROCUREMENT DIVISION
P.O. BOX D
TOOELE, UTAH 84074

BY

ERTEC WESTERN INC.
3777 LONG BEACH BOULEVARD
LONG BEACH, CALIFORNIA 90807

PROJECT NO. 82-160

NOVEMBER 20, 1981

72

Ertec
The Earth Technology Corporation

Ertec Western, Inc.

3777 Long Beach Boulevard • P.O. Box 7765 • Long Beach, California 90807
Telephone: (213) 595-6611/979-1721 • Telex: 656338

November 25, 1981

Procurement Division
Tooele Army Depot
P.O. Box D
Tooele, Utah, 84021

Attention: Ms. Rafaelita Martinez

Subject: DOD Contract DAAG49-81-C-0192

Dear Ms. Martinez,

In accordance with the requirements of subject contract, and pursuant to Part II, Section I, DAR 7.190912, titled "Changes", Ertec Western Inc., submits herein a not-to-exceed proposal in the amount of $192,068 (cost) $18,247 (fee), for a total of $210,315, to implement a change based upon redirection of the technical plan as a result of data review in Phase I, Work Elements 1.0 and 2.0.

It is requested that authorization to proceed with funding in the amount of $210,315 be furnished to Ertec Western no later than December 11, 1981, in order to meet the proposed program schedule.

If I can be of any service in this matter, please contact me at (213) 595-6611, extension 2425.

Regards,

Sylvia Fowler

Ms. Sylvia Fowler
Project Administrator

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PART III

Program and Resources Management

PART III PROGRAM & RESOURCES MANAGEMENT

PROGRAM MANAGEMENT

Ertec is committed to the timely and satisfactory performance of work for the USATHAMA. Mr. Robert Stollar, the Project Manager, will act with authority through Dr. Carl Stepp, Vice President for Geosciences. Mr. Carlos Espana, President, will provide corporate assistance as needed. Mr. Stollar is the primary point of contact with the USATHAMA and will receive support directly from Mr. John Keller, Corporate Contracts Manager, and from Mr. Alain Sharp, Corporate Quality Assurance Manager.

Project Team members were selected based on their competence to perform and manage specific activities; their experience on large, complex projects; and their proven ability in written and oral communication.

Ertec is committed to the successful business and technical management of the proposed work. This commitment is demonstrated by our assignment to the project of highly qualified, experienced personnel and by the establishment and use of an integrated project management structure. Staffing is designed to give balanced attention to technical goals, cost/schedule baselines, and subcontracts administration.

Successful management of large, complex programs such as the Exploratory Stage at TEAD requires (1) thorough attention to the four basic management processes (organize, plan, monitor, control), (2) soundly conceived and thoroughly documented project baselines (technical, cost, schedule), and (3) a data gathering and reporting system which effectively monitors actual costs, schedules, and technical performance. Ertec has the management systems and experienced personnel to satisfy confidently these management requirements and ensure success of the program. We will manage our resources with the use of a comprehensive project management system which integrates cost and schedule targets with technical scope. Baseline definition and management are ensured through a system to organize, plan, monitor, and control the project. Ertec has provided a Management Plan and a Technical Program Plan in accord with the contract, together with Cost, Milestone Schedule, and Manpower Plans as provided for in the contract.

Ertec and its project team are self-sufficient, with required personnel for geological studies, project control, technical coordination, contracts/sub-contracts administration, and other support functions necessary for integrated planning, execution, and control of all project activities. Full-time personnel will be assigned to and physically located in the Long Beach office.

Organization of the proposed effort is shown in the project organization chart (Figure 1). Responsibility for technical performance and administrative control will be provided by the Manager of Hazardous Waste Group, Mr. Robert Stollar. The Project Manager will direct all day-to-day activities of the project and will interface with the Technical Manager, Quality Assurance, and the Technical Advisory Committee. Mr. Stollar is an authority on hazardous-waste disposal, ground-water contamination, and the use and application of geophysics and computer techniques in the solving of geological and hydrological problems. He has worked with USATHAMA to solve problems at the Rocky Mountain Arsenal (RMA) which are similar to those at TEAD. During his continued association with USATHAMA and RMA, Mr. Stollar has been involved in many technical and management tasks.

Mr. Stollar has worked with USATHAMA consultants to develop generic ground-water flow and solute-transport models. He has described regional aspects of geological and hydrological systems and has characterized the ground-water flow and contaminant migration patterns at RMA. Continued involvement at RMA includes

TOOELE A... DEPOT
ENVIRONMENTAL CONTAMINATION SURVEY
PROJECT ORGANIZATION CHART

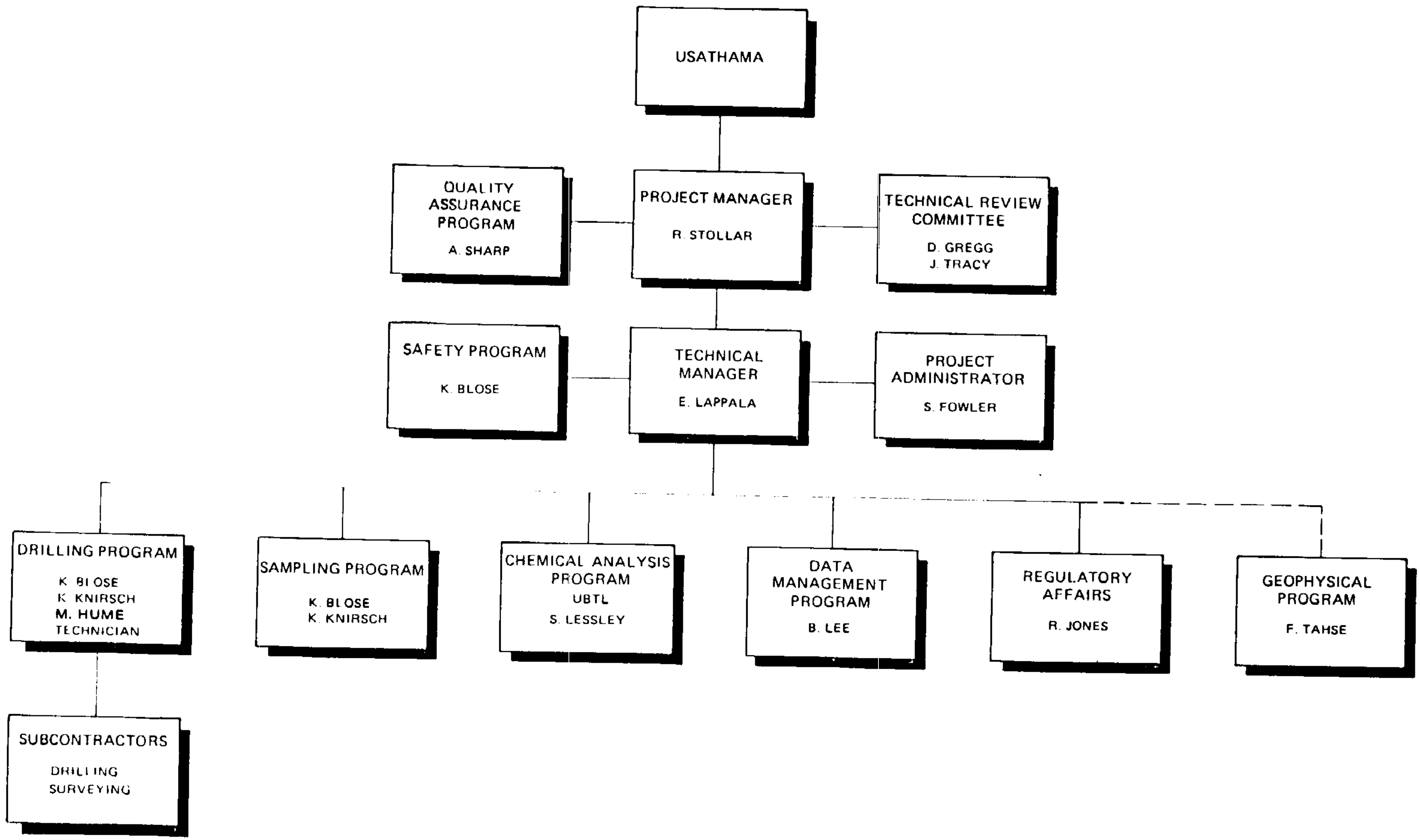


FIGURE 1

identification of present and potential sources and movement of contaminants, design and evaluation of regional and arsenal-wide drilling and data collection programs; participation with ground-water contamination migration control and abatement team; and conceptualization of ground-water contamination migration control and abatement schemes. He also was involved in evaluating ground-water impacts caused by proposed abatement programs.

Mr. Stollar's present involvement at RMA is to update the hydrogeological system and to further define the ground-water flow and contamination migration patterns in order to model different contaminant control and abatement schemes.

He directed a portion of a large study to locate waste disposal sites for high-level radioactive wastes in three states. The investigation involved studying the geology, hydrology, water use, mechanisms and rates of salt dissolution, and ground-water movement in deep aquifers containing varying density fluids.

He has also directed a variety of studies in exploration and evaluation of ground-water resources. He was one of the principal investigators carrying out a ground-water investigation for the Jamesport nuclear plant in northeastern Long Island. The study determined the effects of pumping ground water from a shallow aquifer on the saltwater front and on the ground-water system. Detailed pumping tests were designed, carried out, and interpreted. With these data, the ground-water system was simulated with digital model. The ground-water system also was modeled to determine the regional impact as caused by construction dewatering. With the use of this model, impact and techniques of construction dewatering were optimized. In addition, salt water encroachment was studied and modeled by Princeton University under Mr. Stollar's direction. Mr. Stollar appeared as an expert witness at hearings before state and local regulatory and environmental agencies. The project was carried out for the Long Island Lighting Company.

Mr. Stollar was part of an interdisciplinary team which carried out an impact assessment of the Lake Padgett Pines Development (a regional impact report) in Land O'Lakes, Florida. The study helped to determine what effects the development would have on the ground-water system. A monitoring program was designed to protect the ground-water environment and the development's ground-water supply. Mr. Stollar also testified as an expert witness before state and local agencies and during legal proceedings.

Other studies have been conducted in the northeastern, southeastern, midwestern, and western portions of the United States, as well as Puerto Rico and Pakistan. A detailed list of his work experience follows:

- Mapped major structural lineations in metamorphic rocks in southwestern Connecticut. Developed method of test pumping to locate the depth of the water-bearing fractures and to determine the long-term yield of wells tapping fractured bedrock aquifers.

- Performed resistivity study in Kansas to estimate the lateral and vertical extent of a contaiminated ground-water body. Designed drilling and testing program to resolve water quality problems experienced by a major industrial client.

- Evaluated the ground-water resources in the Newark, Delaware, area for Artesian Water Company. Determined the long-term yield of the entire well field and the individual well efficiency. Studied impact of regional pumpage on the well field, movement of contaminants from a landfill toward the well field, and localized saltwater encroachment.

- Evaluated ground-water resources of the major unconsolidated aquifer in the Lahore, Pakistan area. Used mathematical models to predict effects of large ground-water diversions for increasing water use. Reviewed problems of well design and well clogging.

- Determined the geometry, movement, and attenuation of a contaminated ground-water slug using earth resistivity method. Designed and carried out a drilling progrm using these data. Designed and initiated a monitoring program to determine changes or movement of the contaminated ground-water body.

The Project Quality Assurance Coordinator (PQAC) provides direct support to the Project Manager. The PQAC, Mr. Alain Sharp, controls all quality assurance activities in the field and office for Ertec, and monitors QA activities of subcontractors. He will interface with field QA personnel. The Project Manager also will be assisted by The Technical Advisory Committee, Mr. Dean Gregg, Manager of Hydrogeology, and Mr. James Tracy, Senior Hydrogeologist.

The Technical Manager, Mr. Eric Lappala, is responsible for the technical tasks during all project phases including the technical review of program plans, results, and interpretations. Mr. Lappala interfaces directly with the Project Safety Officer and monitors both the field and office operations. He will coordinate with the Principal Investigators to provide for the controlled transfer of data and information. Mr. Lappala also will be responsible for maintaining a strong, well-balanced technical program and accurate control of project costs and scheduling through interaction with the Principal Investigators and the Project Administrator.

The Project Administrator, Ms. Sylvia Fowler, manages cost and schedule control functions, budget forecasting, change control, project accounting, field project administration and logistics. The Safety Officer, Mr. Kevin Blose, will monitor the safety and health aspects of the field program. The Principal Investigators are responsible for carrying out the drilling and sampling elements of the field program. Decisions to modify approaches of any work element must be reached jointly between the Technical Manager and the Principal Investigators, with the approval of the Project Manager.

The Technical Project Manager, Mr. Eric Lappala, has directed many large projects related to ground-water resources and contamination. Mr. Lappala is an authority on ground-water flow in both the saturated and unsaturated zones; modeling of moisture, heat, and solute in the unsaturated zone; and development of experimental methods and techniques to analyze these parameters in the unsaturated zone. He also has directed projects to develop sampling protocol, modeling, and monitoring at Rocky Mountain Arsenal for USATHAMA. Mr. Lappala presently is developing techniques to sample contaminants in the unsaturated zone. He has had 13 years of experience in these areas, working as a hydrologist for the U.S. Geological Survey in Colorado, New Mexico, and Nebraska.

As a Senior Hydrogeologist at Ertec, Mr. Lappala serves as project manager and technical advisor for projects in the Hazardous Waste and Hydrogeology groups, with emphasis on contaminant hydrogeology, unsaturated zone, modeling, and other highly complex and analytical problems. He also researches, develops, and carries out field testing utilizing state-of-the-art field techniques; participates in general ground-water studies; and directs a program of applied research on unsaturated zone and waste-management problems.

Mr. Lappala's experience includes the following:

- Served as principal investigator of a quantitative ground-water study of a 4,000-square-mile area of northeastern New Mexico.
- Performed basic and applied research relating to the occurrence and movement of water, solutes, and heat in the unsaturated zone.
- Designed and executed laboratory and field experiments for heat and moisture movement relating to problems of radioactive waste disposal and ground-water recharge in arid and semiarid areas.
- Prepared field, laboratory, and model studies of flow and transport in the unsaturated zone.
- Performed ground-water/surface-water modeling studies of two areas in southwest Nebraska and one in northeast Nebraska. Incorporated interdisciplinary methodologies in developing quantitative descriptions of the hydrologic systems involved.
- Developed and applied digital modeling techniques for stream-aquifer studies of the entire Platte River Basin in Nebraska.
- Assisted in research on methods of determining soil moisture.

The Principal Investigators for the Drilling and the Sampling Programs are Mr. Kevin Blose and Ms. Karen Knirsch. Both have had extensive drilling experience in alluvial fill during the Air Force's MX drilling program in the Great Basin of Utah and Nevada. This experience has included Field Geologist, Drill Rig Supervisor, and Field Supervisor. In addition, both have been responsible for water-quality sampling, field chemical analyses, water-level measurements, and aquifer pump testing and analyses. Ms. Knirsch has been Assistant Manager of the MX water resources drilling program. Mr. Blose also will act as the Project Safety Officer. Mr. Blose has an advanced degree in toxicology from Drexel University and has several years of first-hand experience in the handling of hazardous and toxic waste. Both Mr. Blose and Ms. Knirsch have prepared and demonstrated new sampling techniques at Rocky Mountain Arsenal for USATHAMA. Table I shows the amount of time spent on the project by key personnel.

The administrative program, monitored by Ms. Sylvia Fowler, addresses the externally oriented elements of invoicing and monthly Performance and Cost Reporting, as well as contract and subcontract administration and procurement.

Internally, cost and manhour planning and tracking are projected in a numerical and graphic format, that allows visibility on all levels of project performance.

Control of Subcontracted Work

Ertec recognizes that a subcontractor cannot be left to do the work without proper contract and technical management. A "hands-on" approach will be used to control the subcontract work, and to synchronize it with in-house work. The Technical Manager will be current on each subcontract. The Project Administrator will analyze, evaluate and compare costs incurred with milestones attained, while coordinating with the Technical Manager to evaluate the technical accomplishments and deliverables. Certain cost and schedule data will be routinely entered to Ertec's Project Management Control System to ensure that management attention is focused on the significant cost area.

Table I Project Time for Key Personnel

Key Personnel	Total Hours	% of Time	Program Status
R. Stollar[1]	269	30%	Program Manager
E. Lappala[1]	480	54%	Senior Hydrogeologist -Technical Manager
K. Blose[2]	1059	81%	Project Hydrogeologist (Principal Field Investigator)
K. Knirsch[2]	1095	84%	Project Hydrogeologist (Principal Field Investigator)
A. Sharp[1]	64	7%	Quality Assurance
M. Hume[2]	713	55%	Staff Hydrogeologist
Technician, Field[2]	641	49%	Technician

[1]Based on 112 working days from December 1, 1981 through May 16, 1982, or 896 total average working hours.

[2]Based on 138 working days (includes weekends for field work, 12 hours shifts for 50 of those days) or 1304 total working hours.

To accomplish the work elements in a cost effective and technically proficient manner, the Principal Investigators maintain direct contact with UBTL, Stephenson Drilling Company, and Fox Drilling Company. This provides for an integrated approach to exploring the environmental contamination at Tooele Army Depot. The Project Manager and Field Coordinator for UBTL will be Dr. Sim Lessley. The UBTL Program and Resource Management is described in Volume II.

Onsite Operations

The onsite operations will be under the direct supervision of the Technical Manager. In addition, the Project Safety Officer will be a member of the field crews and will evaluate field procedures and report any necessary deviations in techniques used to the Manager of Hazardous Waste. Both Principal Field Investigators will be on the site during all drilling and sampling activities.

Ertec proposes to establish on onsite office/laboratory to service both the data collection and data evaluation programs that are conducted at Tooele Army Depot as specified by USATHAMA. This unit will be equipped with proper communications, safety equipment, field sampling and testing equipment, and all necessary supplies.

The Ertec Technical Manager will interface directly with any other onsite contractor as well as representatives of USATHAMA and Tooele Army Depot who may be present. It is Ertec's plan to keep both USATHAMA and the Tooele Army Depot advised in detail of all operations conducted at the site on a daily basis.

Review Procedure

The ultimate in-house review for technical quality will be provided by the Technical Review Advisors Committee, and by Dr. J. Carl Stepp, Ertec Vice President for Geosciences and Managing Principal of this project. Day-to day review will be provided by Robert Stollar, Project Manager. These individuals will regularly review progress of work to ensure that proper direction and quality is maintained and that the organization is functioning as planned.

To ensure proper coordination with USATHAMA and the Tooele Army Depot, meetings have been scheduled at key points within the project performance. These meetings will keep both USATHAMA and Tooele Army Depot well informed on progress of the work and will provide opportunities to comment directly on the work.

Mobilization and Scheduling

Ertec proposes a 5-month period for field work and interpretation. The Phase II field program is planned for completion by the end of month four. The final project work will be completed by month 6. Such a schedule requires timely USATHAMA reviews and approvals. The detailed project schedule and hours are shown in Figure 2.

Ertec will be able to begin work and mobilize within 2 weeks after authorization of work is given. Considering our current and planned work load, Ertec can complete all required work as outlined in our project period. A set of detailed plans related to the accomplishment and interrelationships of specific geotechnical, sampling, and analytical tasks which are projected for Ertec are shown in Figures 3 and 4. These schedules and plans are presented to demonstrate that the proposed program is reasonable and that specific program goals are achievable within allotted time constraints and resource allocations. It is recognized that the actual project plan will likely differ from that detailed and proposed in these Figures, depending on the specific problems encountered. Ertec and UBTL are prepared to alter plans and schedules as dictated by the nature of the work and are committed to effect essential program modifications in order to achieve project objectives. Nevertheless,

Ertec

PROJECT TIME ESTIMATING LOG

CUSTOMER NAME	U.S. Army
PROJECT LOCATION	Tooele Army Depot, Utah
PROJECT NAME AND NUMBER	Exploratory Stage Environmental Contamination Survey, TEAD Contract No. DAAG 49-81-C-0192
DATE ISSUED	July 27, 1981
DATE REVISED	November 24,1981
PROJECT DEPT. HEAD	Robert Stollar

FIGURE 2

RESOURCE REQUIREMENTS — MAN HOURS

Phase	Element	Item	TASK DESCRIPTION	PM / RS	SNH / EL	SH / KB	SH / KK	AH / DG	SNH / JT	PS / RJ	QA / AS	SH / MH	TC/AN / -	CP/CS / -	PA / SF	SG/PG / -	GP/TT / -	UBTL DL / STAFF	UBTL IL / SL	UBTL IL / ES	UBTL IL / KTW	UBTL IL / LE	AB	SS
I	1.0	A	Data Review: Post Award Contract Meeting	32	32																			
		B	Site Meeting, Tooele, Utah	16	24	40													32					
		C	Data Review	8	16	40	40																	
	2.0		Development of Potential Contaminant Profile	8	8	40																		
	3.0	A	Formulation of Technical Plan: Technical Plan	11	9	30		4	4	16						40	20		60					
		B	Data Management	5	15	10													20					
		C	Addendum to Phase I - 3.0	40	40	80	80								96									

SUBTOTALS BY TASK

I	1.0A	96
	B	80
	C	104
	2.0	56
	3.0A	194
	3.0B	50
	3.0C	336

SUBTOTALS ERTEC PERSONNEL

PM	SNH	SH	SH	AH	SNH	PS	QA	SH	TC/AN	CP/CS	PA	SG/PG	GP/TT
120	144	240	120	4	4	16	-	-	-	-	96	40	20

SUBTOTALS UBTL PERSONNEL

DL	IL	IL	IL	IL
-	112	-	-	-

TOTALS

Ertec	804
UBTL Indirect	112
	916

EXPLANATION

PM	PROJECT MANAGER	CP	COMPUTER PROGRAMMER
AH	ASSOCIATE HYDROGEOLOGIST	CS	COMPUTER STAFF
SNH	SENIOR HYDROGEOLOGIST	GP	GRAPHICS
SH	STAFF HYDROGEOLOGIST	TT	TECHNICAL TYPING
PS	PROJECT SCIENTIST	UBTL	LAB SUBCONTRACTOR
QA	QUALITY ASSURANCE	BS	DRILLING SUBCONTRACTOR
PA	PROJECT ADMINISTRATOR	AB	SURVEYOR SUBCONTRACTOR
TC	TECHNICIAN	DL	DIRECT LABOR
PH	PROJECT HYDROLOGIST	IL	INDIRECT LABOR
SG	SENIOR GEOPHYSICIST	AN	ANALYST
PG	PROJECT GEOPHYSICIST		

Ertec The Earth Technology Corporation

PROJECT TIME ESTIMATING LOG

PROJECT NAME AND NUMBER	Exploratory Stage Environmental Contamination Survey, TEAD Contract No. DAAG 49-81-C-0192
CUSTOMER NAME	U.S. Army
DATE ISSUED	July 27, 1981
DATE REVISED	November 24, 1981
PROJECT LOCATION	Tooele Army Depot, Utah
PROJECT DEPT. HEAD	Robert Stollar

FIGURE 2 (CONT'D)

RESOURCE REQUIREMENTS — MAN HOURS

Phase	Element	Item	TASK DESCRIPTION (Personnel Classification / Person Assigned)	PM RS	SNH EL	SH KB	SH KK	AH DG	SNH JT	PS RJ	QA AS	SH MH	TC/AN -	CP/CS -	PA SF	SG/PG -	GP/TT -	UBTL DL STAFF	UBTL IL SL	UBTL IL ES	UBTL IL RTW	UBTL IL LE	AB	SS
II	1.0		Development of Safety Program	4	8	20													10	10	10			
	2.0		Development of Quality Assurance Program	4	4						8											24		
	3.0		Geotechnical Program:																					
	3.1	A	Geophysical Investigation										321/292			81/212	36/18							
	3.1	B	Site Clearance			15	35						/40			/160								
	3.1	C	Management-Geophysical Investigation	16	40																			
	3.2		Drilling Program																					
	3.2	A	Project Management	80	154																			
	3.2	B	Quality Assurance	10	23	57	68				40	57	32/											
	3.2	C	Data Management	10	23	57	68					57	32/											
	3.2	D	Drilling Supervision			431	517					460	256/											
	3.2	E	Safety			29	27																	
	3.2	F	Drilling																					X
	3.2	G	Surveying																				X	
	4.0		Sampling Program:																					
		A	Project Management	8	21																			
		B	Quality Assurance	1	3	24	24				16											48		
		C	Data Management	1	3	24	24																	
		D	Sampling			193	193																	
	5.0		Chemical Analysis:																					
		A	Project Management	10	27														90	144	144			
		B	Quality Assurance															391	20	23	23	248		
		C	Data Management																20	23	23			
		D	Analysis															2353						
	6.0		Data Management (Data Entry)											37/125										
	7.0		Contaminant Assessment:																					
	7.0	A	Analysis & Evaluation	100	139	167	111	4	4	4		139					100/80							
		B	Quality Assurance	12	17	21	14																	
		C	Data Management	13	18	21	14																	
			Project Administration												400									

SUBTOTALS ERTEC PERSONNEL

PM RS	SNH EL	SH KB	SH KK	AH DG	SNH JT	PS RJ	QA AS	SH MH	TC/AN	CP/CS	PA SF	SG/PG	GP/TT
269	480	1069	1095	4	4	4	64	713	641/332	37/125	400	81/372	136/98

SUBTOTALS UBTL PERSONNEL

DL STAFF	IL SL	IL ES	IL RTW	IL LE
2744	140	200	200	320

SUBTOTALS BY TASK

II	1.0	62
	2.0	40
	3.0	
	3.1A	960
	3.1B	250
	3.1C	56
	3.2	
	3.2A	234
	3.2B	287
	3.2C	247
	3.2D	1664
	3.2E	56
	3.2F	
	3.2G	
	4.0	
	4.0A	29
	4.0B	116
	4.0C	52
	4.0D	386
	5.0	
	5.0A	415
	5.0B	705
	5.0C	66
	5.0D	2353
	6.0	162
	7.0	
	7.0A	848
	7.0B	64
	7.0C	66
		400

TOTALS

Ertec	5914
UBTL Direct	2744
Indirect	860

Project Total 9518

EXPLANATION

PM PROJECT MANAGER
AH ASSOCIATE HYDROGEOLOGIST
SNH SENIOR HYDROGEOLOGIST
SH STAFF HYDROGEOLOGIST
PS PROJECT SCIENTIST
QA QUALITY ASSURANCE
PA PROJECT ADMINISTRATOR
TC TECHNICIAN
PH PROJECT HYDROLOGIST
SG SENIOR GEOPHYSICIST
PG PROJECT GEOPHYSICIST
CP COMPUTER PROGRAMMER
CS COMPUTER STAFF
GP GRAPHICS
TT TECHNICAL TYPING
UBTL LAB SUBCONTRACTOR
SS DRILLING SUBCONTRACTOR
AB SURVEYOR SUBCONTRACTOR
DL DIRECT LABOR
IL INDIRECT LABOR
AN ANALYST

GUI

PROJECT SCHEDULE
CONTAMINATION SURVEY
TOOELE ARMY DEPOT

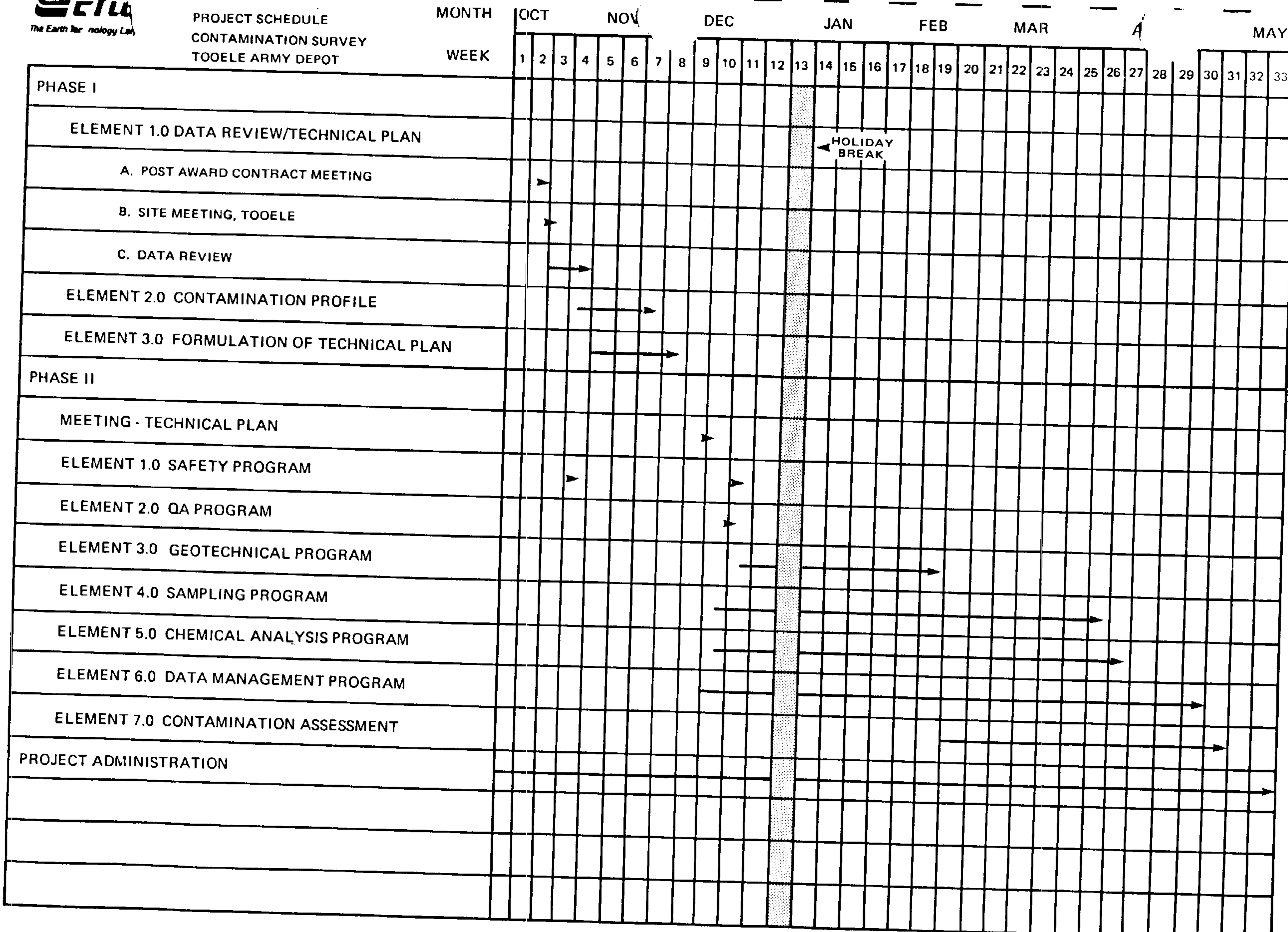
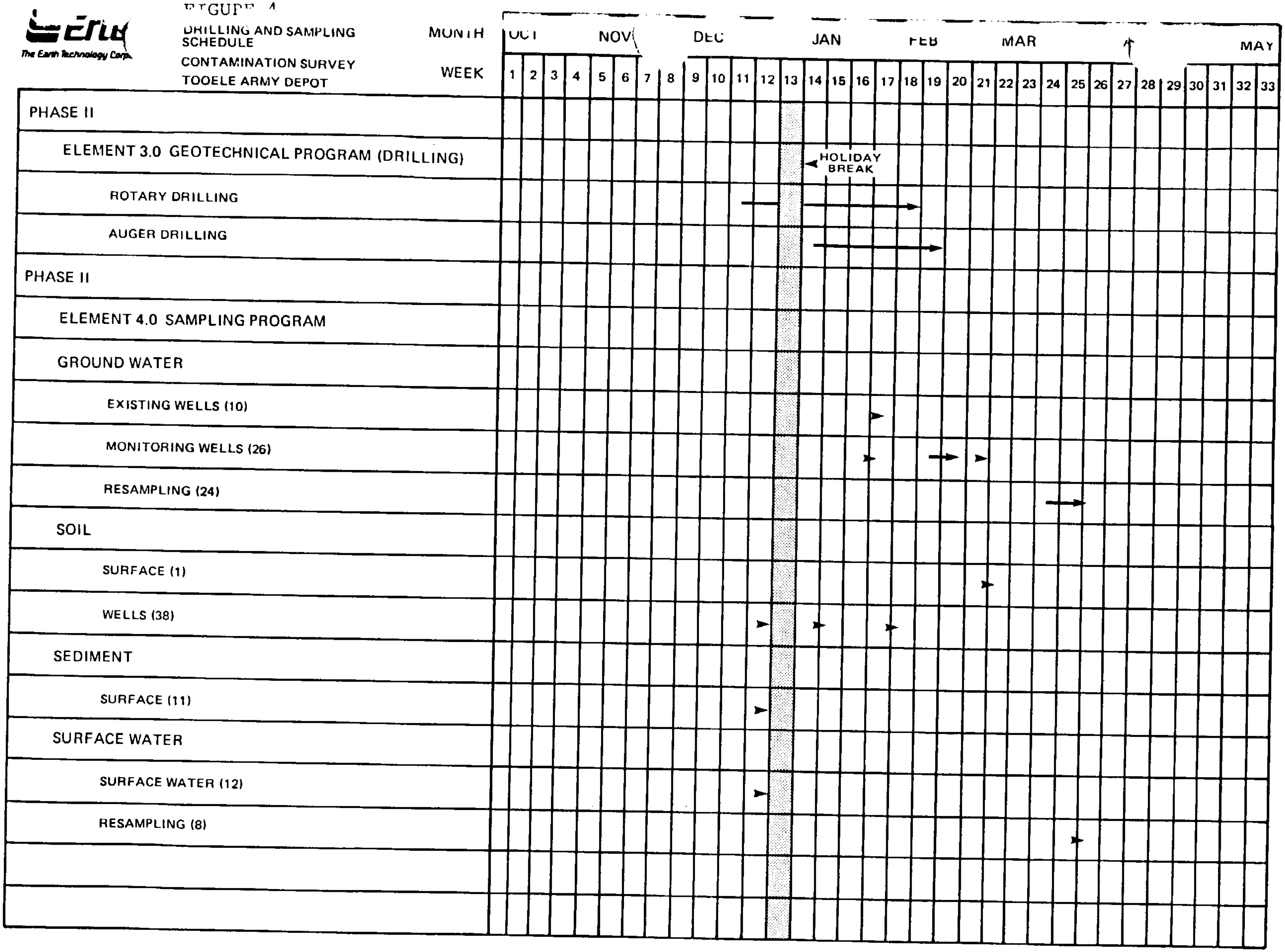


FIGURE 4
DRILLING AND SAMPLING SCHEDULE
CONTAMINATION SURVEY
TOOELE ARMY DEPOT



the proposed schedules and plans provide a useful model for assessing the requirements of the project.

RECORDKEEPING AND REPORTING

The following reports have been proposed for this project:

Monthly Performance and Cost Reports:

1. Quantity: Three copies.
2. Due Date: Not later than 10 working days after the end of each calendar month.
3. Content: Current status, projected requirements of costs, man-hours and work completion.

Weekly Technical Reports:

1. Quantity: One copy.
2. Due Date: Weekly; as required.
3. Content: Report technical accomplishments on assigned task(s).

Technical Report- Quality Control Certification Data:

1. Quantity: Four copies.
2. Due Date: Not later than 60 days after contract award.
3. Content: Reocrd of technical accomplishments on an assigned task(s) and dissemination of these data.

Technical Report - Log Books and Data Management Software:

1. Quantity: Two copies.
2. Due Date: Within 30 days after contract completion.
3. Content: Record of contractor's technical accomplishments on an assigned task(s) and dissemination of these data. Log books, daily journals, laboratory notebooks, field engineering notebooks, and any software developed during the contract would be included in the category.

Final Technical Report:

1. Quantity: Three copies of draft; ten copies of final.
2. Draft report due: Not later than 45 days after completion of sampling analysis.
3. Contents: All technical work accomplished, and information gained, design criteria where applicable, artwork, and photo negatives.
4. Final report due: Within 15 days after draft report approval.

Monthly Technical Report

Ertec will prepare and submit monthly reports in written form. They will contain results of the data collection, compilation, and analyses accomplished during the reporting period. This report will present all work started and results achieved during the monthly reporting period, indicate current problems that may impede performance, the corrective action proposed, and outline the work forecast for the next period. Progress and planning will be related to the original work schedule approved by USATHAMA. The format of this report will correspond to that designed by the USATHAMA.

Oral Presentations

Ertec will present orally the technical results and progress accomplished or as outlined in the Project Schedule. This oral report will contain both technical and financial information and will be presented 30 days after analytical results are completed.

Draft Final Report

Ertec will prepare and submit to the Project Officer draft copies of a final report within 45 days after completion of the sampling and analysis program.

The draft copy shall be prepared in accordance with MIL-STD-847 and the preparation instructions outlined in Appendix F of the contract, Data Item Description No. UDI-S-23272-C, item 10.

Final Report

Within 15 days from receipt of notice of approval, Ertec will transmit a reproducible master and the required number of copies of the final report in final form to the designated distribution addresses listed in Appendix F of the contract, Sequence No. A007.

PART IV

ESTIMATED REVISED COSTING

1.0 Contract Change Proposal Overview

1.0 Contract Change Proposal Overview

1.1 Introduction

This change proposal is submitted in response to re-direction of the technical statement of work, contract DAAG49-81-C-0192.

1.2 Assumptions and Conditions

It is assumed all applicable terms and conditions of the original proposal response, dated July 27, 1981, the best and final offer, dated September 22, 1981, and the above referenced contract will continue to govern the performance of these tasks.

1.3 Authorized Representation

The names and addresses of our authorized representatives, for purposes of negotiation and contract administration are:

- Mr. John P. Keller, Manager of Contracts
- Mr. Robert L. Stollar, Manager of Hazardous Waste Group

Ertec Western, Inc.
3777 Long Beach Boulevard
Long Beach, CA 90807
(213) 595-6611

2.0 Estimating Guidelines

2.1 Direct Labor

The detailed labor hours are summarized in Exhibit I and further detailed as shown on Exhibit III for each task.

2.2 Direct Labor Rates

Labor rates shown on the following exhibits are direct hourly rates, or equivalent hourly rates for salaried personnel, paid to each person that is identified individually. Average rates are shown for persons not identified by name. These average rates are based on June, 1981 salary costs. All labor rates are escalated effective December 1, 1981.

2.3 Overhead Rates

In accordance with Cost Accounting Standard Number 410, expenses are allocated into two pools, namely Engineering (Direct Labor) Overhead and General and Administrative (G&A) Expenses. The indirect rates forecast in the original proposal, dated July 27, 1981, have proven to be lower than the actual indirect costs. As a result, the new rates of 79.36% overhead, and 38.48% G&A are being utilized in this estimate of revised costing. The approved subcontracts and Atterberg Testing, that are included in Phase II, Work Elements 3.2 and 4.0, (excluding the Surveyor Subcontractor), are not treated as third party reimbursables for the purposes of this proposal. Therefore the associated costs are not burdened with General and Administrative expense.

2.4 Fee

A fee of 9.5% is requested in this contract change proposal.

2.5 Other Direct Costs

2.5.1 The Other Direct Cost Estimates were derived from:

- Current market prices as supplied from vendors or services.

- o Cost Experience of technical programs of comparable effort.

2.5.2 Total Other Direct Cost estimates by category are summarized on Exhibit II and further detailed in Exhibit III for each task.

2.5.3 Consultant rates used were derived from:

Letter of Agreement between identified consultants and Ertec Western, Inc.

Rates experienced from similar consultant discipline services

2.5.4 Addition - Data Requirements 1423

Labor hours related to completion of Data Requirement 1423 are shown in Exhibit III (CDRL). Preparation and reproduction costs also are shown in Exhibit III.

3.0 DD 633

DEPARTMENT OF DEFENSE
CONTRACT PRICING PROPOSAL

FORM APPROVED
OMB NO. 22-R0341

This form is for use in procurements when submission of cost or pricing data is required (see DAR 3-807)

NAME, ADDRESS, AND TELEPHONE NUMBER OF ORGANIZATIONAL ELEMENT RESPONSIBLE FOR SUPPORTING PROPOSAL

Ertec Western, Inc.
3777 Long Beach Blvd.
Long Beach, CA 90807
(213) 595-6611

TYPE OF CONTRACT

PLACE(S) AND PERIOD(S) OF PERFORMANCE

Tooele Army Depot, Utah

Ertec Western, Inc.
Long Beach, CA

October 1, 1981- March 31,1982

TOTAL COST $192,068
PROFIT/FEE 18,247
TOTAL $210,315

TYPE OF PROCUREMENT ACTION
☐ NEW PROCUREMENT ☐ LETTER CONTRACT ☐ OTHER (Specify)
☐ CHANGE ORDER ☐ UNPRICED ORDER
X PRICE REVISION/REDETERMINATION

LINE ITEM NO.	IDENTIFICATION	QUANTITY	TOTAL PRICE	REF
	Estimated Costs for Redirection of Geotechnical Services		$210,315	

NOTE: List and reference the identification, quantity and total price proposed for each contract line item. A line item cost breakdown supporting this recap is required unless otherwise specified by the Contracting Officer. (Attach continuation page if required.)

I. IF YOUR ACCOUNTS AND RECORDS HAVE BEEN REVIEWED IN CONNECTION WITH ANY GOVERNMENT CONTRACT (PRIME OR SUBCONTRACT), GRANT OR PROPOSAL WITHIN THE PAST 3 YEARS BY A GOVERNMENT AGENCY OTHER THAN IRS OR GAO, PROVIDE NAME, ADDRESS AND TELEPHONE NUMBER BELOW

CONTRACT ADMINISTRATION OFFICE

AUDIT OFFICE
DCAA
34 Civic Center Plaza, Room 423
Santa Ana, CA 92701

II. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS WORK?
XX YES ☐ NO *(If yes, identify)* Received

III. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?
X YES ☐ NO *(If yes, identify)* ☐ ADVANCE PAYMENTS X PROGRESS PAYMENTS OR ☐ GUARANTEED LOANS

IV. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS?
☐ YES XX NO *(If yes, identify items, customers and contract numbers)*

V. IS THIS PROPOSAL CONSISTENT WITH YOUR ESTABLISHED ESTIMATING AND ACCOUNTING PRACTICES AND PROCEDURES AND DAR SECTION XV COST PRINCIPLES?
X YES ☐ NO *(If no, explain)*

VI. COST ACCOUNTING STANDARDS BOARD (CASB) DATA (PUBLIC LAW 91-379 AS AMENDED)

a. WILL THIS PROCUREMENT ACTION BE SUBJECT TO CASB REGULATIONS?
☐ YES XX NO *(If no, explain)*
Small Business Exemption

b. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASB DS-1 or 2)?
☐ YES XX NO *(If yes, specify the office to which submitted and if determined to be adequate)*

c. HAVE YOU BEEN NOTIFIED THAT YOU ARE OR MAY BE IN NONCOMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS?
☐ YES XX NO *(If yes, explain)*

d. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS?
☐ YES XX NO *(If yes, explain)*

This proposal is submitted in response to (RFP, contract, mod, etc.) Contract DAAG49-81-C-0192
and reflects our best estimates and/or actual costs as of this date, in accordance with the instructions of this form.

TYPED NAME AND TITLE
John Keller, Manager Contracts

SIGNATURE

NAME OF FIRM
Ertec Western, Inc.

DATE OF SUBMISSION
November 25, 1981

DD FORM 633
Previous edition is obsolete. (Replaces DD Forms 633-1 through 633-7 and DD Form 633-8, which are obsolete.)

Work Element	LABOR Original Proposal	Re-Evaluation	Variance	Comments*	Reference Page	ODC Original Proposal	Re-Evaluation	Variance	Comments	Reference Page
Phase I Element 1.0-A Collect/Review Data	1,453	1,453	--		32	2,138	2,138	--		32
B	1,340	1,340	--		32	--	--	--		32
C	1,420	1,420			32	1,299	1,299	--		32
Element 2.0								--		
Dev. Potential Contamination Profile	807	807			32	--	--	--		
Phase I Element 3.0 Formulation Tech. Plan	2,208	8,371	6,163	1,2,9	32, 33	--	1,104	1,104		33
Phase II Element 1.0 Safety Program	488	491	3	3	34	--	--	--		
Element 2.0 Quality Assurance	319	319	--		35	--	--	--		
Element 3.1-A Geophysical Investigation	1,459	11,683	10,224	1,10	36	1,755	16,051	14,296		36
Element 3.1-B Site Clearance	3,292	3,469	177	3	37	500	500	--		37
Element 3.1-C Proj. Mgmt.	--	1,315	1,315	1	37	--	--	--		
Element 3.2 Drilling	15,333	30,686	15,353	1, 11	38	168,264	253,861	85,597		38
Element 4.0 Sampling	7,378	7,181	(197)	6,1, 12	40	186,655	10,102	(176,553)		40
Element 5.0 Chemical Analysis	--	867	867	6, 13	41	--	142,468	142,468		41
Element 6.0 Data Mgmt.	1,810	1,810	--		42	--	--	--		42
Element 7.0 Contaminant Assessment	12,137	14,782	2,645	1,3, 14	43	3,426	3,641	215		43
Project Admin.	1,936	4,868	2,932	1	44	4,500	4,500	--		44
Total Cost	51,380	90,862	39,482			368,537	435,664	67,127		

Work Element		LABOR Original Proposal		LABOR Re-Evaluation	LABOR Variance	LABOR Comments*		ODC Original Proposal		ODC Re-Evaluation	ODC Variance	ODC Comments*
O/H	76.5%	39,306	79.36%	72,108	32,802	8						
G/A	35.0%	31,740	38.48%	62,711	30,971	8	35.0%	29,056	38.48%	50,742	21,686	8
Fee	9.5%	11,630	9.5%	21,440	9,810			37,772		46,209	8,437	
Total		134,056		247,121	113,065			435,365		532,615	97,250	

*See Pages 19 thru 28

Comments

1) Re-direction of technical program required increase of personnel hours.

2) Additional meeting, requested by client.

3) Personnel rate change

4) Re-direction of technical program required increased ODC's.

5) Currently projected travel ODC's higher than proposed.

6) Chemical Analysis effort and Sampling effort costing, addressed separately in re-evaluation.

7) Re-direction of technical program decreased subcontractor costs.

8) Revised Overhead, G&A, see page 5, section 2.3.

Comment 9 -- Work Element 3.0 of Phase I

Justification for Cost Increase for Formulation of the Technical Plan

The increased effort for Phase I was required to accomplish a total reevaluation of the existing hydrogeology data base and interpretative studies. The interpretation given in the RFP upon which the proposal was made indicates the probability of a perched water table over large areas of the North Area of TEAD. Ertec considered this interpretation to have been adequate for the purpose of responding to the RFP. However, discussions with personnel at USGS, USAEHA, and a preliminary review of past reports indicated that the probability of such perched conditions is extremely small.

In addition, finding of a previously unmapped bedrock outcrop during the field reconnaissance of October 16, 1981 indicated the probability of a shallow subsurface bedrock ridge that may have a significant effect on the movement of ground water and contaminants.

A complete reevaluation of the hydrogeologic system and the drilling program was required in the light of these two factors. This task required considerably more staff and senior time than was initially estimated. However, the effort was essential to properly define the flow system based upon existing data to enable the optimal siting of ground-water monitoring wells. In addition to increased staff effort for Phase I, considerable time was required by Senior and staff personnel to properly plan the geophysical exploration and drilling programs so that they would complement each other. Ertec's past experience has shown that the investment of such planning time is more than repaid in terms of a more efficient field exploration program.

Comment 10 -- Work Element 3.1-A of Phase II

Justification for Change Order in Geophysical Program

During the meeting at Tooele to initiate the study, both the North and South Areas were explored. On October 14, through October 16, visits to each source having a high potential for contaminant migration and a helicopter tour were included. During these tours, rock outcrops which have not been discussed in any of the literature were found in the southern portion of the North Area. Because there is potential for these outcrops to be related to and be continuous with the outcrops located in the northeastern portion of the North Area, the conceptual picture of the hydrogeologic system at the Depot may be very different than that originally discussed in any of the preproposal meetings. The conceptual relationship between the outcrops, valley-fill material, ground-water flow and contamination migration systems is illustrated in Figure 3 of Volume I.

Because of these findings, and their effects on contaminant migration, the relationship between the outcrops, fill, and flow patterns needs to be determined to meet the study objectives. Therefore, Ertec recommends program changes to include a geophysical program that will define the subsurface geometry and its impact on the flow system. This program is discussed in the geophysical section of the technical plan in Volume I.

Originally, to determine the significance of the outcrop in the northeastern part of the North Area of the TEAD, a seismic refraction line was to have been run across the outcrop. This would have enabled the determination of the geometry of the bedrock in that specific area. However, as the rock outcrop or subcrop may be continuous with outcrops in the southern part of the North Area, more information needs to be developed. The most cost efficient method to determine this relationship is with a combination of detailed gravity, seismic refraction and resistivity surveys. The gravity survey will be used to detect shallow, subsurface bedrock topography. Where it is important to develop more information on the geometry of this system and contaminant migration, seismic refraction and direct current resistivity surveys will be performed over the shallow bedrock to further define its depth and horizontal dimensions. During the geophysical program, the seismic refraction and resistivity methods will be tested to determine their effectiveness in detecting the water table, the presence of contamination, and porosity of the bedrock.

Comment 11 -- Work Element 3.2

Justification for Change Order in Drilling Program

Important information, such as the Phase I detailed interpretation of the hydrogeologic environment and the results of the drilling program carried out by USAEHA (this information became available to Ertec after October 9, 1981) indicates that the North Area and in particular the northeastern section of TEAD, near the outfalls and spreading grounds, does not contain a perched water table. In the North Area the depth to water ranges from slightly less than 200 to greater than 600 feet below land surface. The geologic section is comprised of alternating layers of coarse and fine grained material. The coarse grained material appears to be well drained. The fine grained material contains moisture but is not saturated. This has been indicated by the USAEHA borings which reached depths as great as 80 feet at certain locations where the moisture content is high in the fine grained material; odors also were noticeable. At this time, very few chemical analyses are available from the USAEHA drilling program.

Because of these new findings, Ertec must recommend major changes for the drilling program. The program objectives are to determine if pollutants are present in the ground water near a contaminant source or near the installation boundary and whether the contaminant has a potential to migrate within the ground-water system across the boundary of the Depot. To accommodate these objectives, wells drilled during the study cannot arbitrarily be drilled to 50 feet where the water table is at a depth greater than 200 feet. Each well should penetrate the entire unsaturated zone and be screened in the top 20 feet of the saturated zone. This is especially true in areas where there is a high potential for contamination. Ertec recommends that, in areas where the unsaturated zone is thick and the potential for contaminants to migrate through this zone toward the water table is high, boreholes will be initiated with the hollow-stem auger. Geologic samples should be taken as described in the section on sampling. In addition, to detect if contaminants are migrating, split spoon or Shelby-tube cores also should be taken in the major fine-grained formations that are unsaturated. These samples should be sent to UBTL for chemical analyses, after being certified as agent-free by the government.

When the depth capacity of the auger rig is reached, at approximately 80 feet, the drilling method will be changed to the mud-rotary technique. The borehole then can be continued until the water table is reached. The completed well will be screened about 10 or 20 feet below the water table.

Using these techniques at the major sources of contamination will enable Ertec to interpret whether the contaminant has reached the water table and is in a defined pathway that has a potential to migrate towards the boundary. In addition, if the contaminant has not reached the water table, Ertec will be able to approximate to what depth the contaminant has migrated and whether or not it has a potential to reach the water table.

The differences in the drilling program are as follows:

<u>Drilling Program in Proposal - North Area</u>

Number of Wells	Depth (feet below surface)	Drilling Method	Diameter (inches)	Split Spoon or Shelby tube samples
4	300-500	Rotary	4	Approx. every 20 feet
14	50	Auger	4	Approx. every 5 feet
28	50	Auger	2	No soil sampling

<u>New Program for North Area</u>

2	200-250	Rotary	4	every 20 feet
4	250-300	Auger first, finish with Rotary	4	every 5 feet to 80 feet then every 20 feet
4	300-520	Rotary	4	every 20 feet

Drilling Program in Proposal - South Area

Number of Wells	Depth	Drilling Method	Diameter (inches)	Split Spoon or Shelby tube samples
2	300-500	Rotary	4	every 20 feet
12	50	Auger	4	every 5 feet
16	50	Auger	2	No sampling

New Program for South Area

11	20-100	Auger	4	Every 5 feet
5	100-200	Auger and Rotary	4	Every 5 ft. with Auger
1	300	Rotary	4	Every 20 feet

In the old program only 6 wells were drilled to a depth greater than 50 feet. These wells were drilled with the mud rotary method. The other 70 wells were drilled with the auger method to a depth of 50 feet. Of these 70 wells, 26 were cased with the 4" casing and 44 with 2" casing. Soil in the 44 shallow wells was not sampled. After completing the Phase I hydrogeologic interpretation, it was determined that the drilling program must be changed to meet the objectives. In the revised program, 27 wells will be drilled. These wells are much deeper, all are cased with 4" casing, and are sampled with much more detail.

When using the rotary method, drilling cannot be carried out for an eight hour working day. Drilling must be continuous until the borehole is completed. If stopped, the mud could not circulate continuously and the chance for the borehole to collapse and the loss of the drilling bit and drill stem in the hole is high. Therefore, continuous drilling on a 24 hour basis is necessary. This becomes very labor intensive. Therefore, manhours and perdiem costs increase.

Also, as the boreholes are deeper and sampling is much more intensive, the time of drilling is increased and the driller's costs are greater. In the new program, all casing is 4 inches in diameter while in the old program much of the casing was 2 inches in diameter. Therefore the casing costs increase. In addition, because the volume of the holes is much greater, the cost of cement increases.

Comment 12 -- Work Element 4.0

Justification for Change Order in Sampling Program

In the original proposal 76 wells were to be sampled, while in the new program, the number of wells to be sampled is 27. Although the number has decreased, the cost remains nearly the same. In the new program, the well depths average 300 feet, while the average depth for wells in the old program is less than 80 feet.

Logistically, the new program is much more difficult. Lowering pumps and 300 feet of cables in a 4 inch diameter well is a task that requires two people. It would become a tedious backbreaking job for one person. The chance of losing equipment in the well would increase due to the depth. Lowering this equipment into deep boreholes in winter months also becomes a safety problem. Therefore, for safety reasons, Ertec sincerely believes that the sampling of deep wells is a job for two people.

In addition, new protocol for sampling has been developed by Ertec for USATHAMA at Rocky Mountain Arsenal. (RMA) This protocol meets USATHAMA requirements and objectives. The sampling at RMA was carried out safely and successfully with two people.

Therefore, although the number of wells has been reduced from 76 to 27, the man-hour cost remains about the same as two people instead of one will be sampling the wells. This will increase the ODC as the subsistence cost will increase.

Comment 13 -- Work Element 5.0

Justification for Change Order for Chemical Analysis

As there is a decrease in the number of samples to be analyzed, there is also a reduction in the cost for chemical analyses.

Comment 14 -- Work Element 7.0

Justification for Change Order in the Contamination Assessment

The number of planned drill holes and ground water monitoring wells is about one third the number given in the Technical Proposal. However, approximately the same footage of holes will be drilled. Consequently, Ertec estimates that an additional 200 project hours will be required to interpret the data obtained from the field exploration program. Adequate definition of the flow system will require a large amount of interpretation of a relatively few number of control points to insure confidence in predicted contamination migration patterns. In addition, more lithologic data will be available that will require interpretation. About two thirds of the footage in the technical proposal was to have been shallow auger holes with an absolute minimum number of samples. The present plan, however, calls for determining lithologic relationship by examination of drill cuttings for each 5 foot interval for every hole.

An additional effort will be required in this task to incorporate the results of the geophysical studies that Ertec considers necessary to adequately understand the hydrogeologic factors that control contamination migration. The technical proposal did not include the analysis of such data. This analytical task is required in addition to that required to reduce the raw geophysical data to map form as decribed in Work Element 3.

Ertec plans to make full use of spatial data analysis tools available in USATHAMA Level IV control Data Base to assist in the interpretive phase of this project. However, given the limited number of control points, Ertec plans to incorporate additional analytical tools such as Kriging to provide the highest degree of confidence possible in the definition of probable contaminant travel times and migration patterns.

EXHIBIT I

Direct Labor Summary

EXHIBIT I

Direct Labor Summary

Associate Hours	345
Senior Hours	637
Project Hours	477
Project Administration Hours	496
Staff Hours	3152
Technician	641
Analyst	332
Cartography	136
Typing	98
Total Hours	6314

EXHIBIT II

Other Direct Cost Summary

EXHIBIT II

Other Direct Cost Summary

Travel		
Transportation	31,159	
Per Diem/Subsistence	16,625	
	47,784	47,784
Subcontractors		
Laboratory	142,468	
Drilling Co.	160,050	
Surveyor	7,250	
	309,768	309,768
Raw Material		
Drilling Mud	3,486	
Gravel	9,280	
Cement	6,980	
	19,746	19,746
Purchased Parts		
PVC	36,230	
Pipe	840	
Locks	137	
Cables, Explosives, Detonators	1,881	
Sampling Bottles	570	
	39,656	39,658
Equipment Rental		
Resistivity Meter	3,000	
Seismograph	600	
Gravimeter	1,200	
Logger	2,430	
Generator	1,800	
	9,030	9,030
Computer		
	2,600	2,600

Testing		
	1,280	1,280
Miscellaneous ODC		
	5,798	5,798
	Total ODC	$435,664

EXHIBIT III

Cost Per Work Element

PHASE I -- DATA REVIEW AND DEVELOPMENT ON DETAILED TECHNICAL PLAN

Work Element 1.0A -	
(As per original proposal)	$3,591
Work Element 1.0B -	
(As per original proposal)	$2,639
Work Element 1.0C -	
(As per original proposal)	$1,420
Work Element 2.0 -	
(As per original proposal)	$ 807
Work Element 3.0 -	
(See page 33 for addendum)	$2,208

PHASE I -- DATA REVIEW AND DEVELOPMENT OF DETAILED TECHNICAL PLAN

Work Element 1-3.0 -- Formulation of Technical Plan - Addendum

Direct Labor	Estimated Man Hours	Rate	Estimated Cost
R. Stollar	40	24.24	970
E. Lappala	40	21.45	858
K. Blose	80	11.11	889
K. Knirsch	80	11.11	889
S. Fowler	96	11.41	1095
		Labor Total	$4701

Meetings Costs

Direct Labor	Estimated Man Hours	Rate	Estimated Cost
R. Stollar	32	24.24	776
E. Lappala	32	21.45	686
		Labor Total	$1462

Other Direct Costs

Airfare		
2 RT - LAX to Salt Lake City @ $320		640
Lodgings - 4 @ $45		180
Subsistence - 6 @ $40		240
Parking/Mileage		44
	ODC Total	$1104
	Total	$7267

PHASE II -- SOURCE AND INSTALLATION BOUNDARY EXIT DEFINITION

Work Element 1.0 -- Safety Program

Direct Labor	Estimated Man Hours	Rate	Estimated Cost
R. Stollar	4	24.24	$ 97
E. Lappala	8	21.45	172
K. Blose	20	11.11	222
		Labor Total	$491

PHASE II -- SOURCE AND INSTALLATION BOUNDARY EXIT DEFINITION

Work Element 2.0 -- Quality Assurance and Quality Control Program

Direct Labor	Estimated Man Hours	Rate	Estimated Costs
R. Stollar	4	24.24	$ 97
E. Lappala	4	21.45	85
A. Sharp	8	17.02	137
		Labor Total	$319

PHASE II -- SOURCE AND INSTALLATION BOUNDARY EXIT DEFINITION

WORK ELEMENT 3.0 -- GEOTECHNICAL PROGRAM

3.1 A. Geophysical Investigation

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
Senior Geophysicist	81	22.12	1792
Project Geophysicist	212	15.76	3341
Senior Technician	236	13.64	3219
Analyst	292	8.48	2476
Cartographer	36	7.55	272
Technical Typing	18	8.79	158
Technician	85	5.00	425
		Labor Total	$11683

Other Direct Costs		
Airfare		
4 RT - LAX to Salt Lake City @ $320		1280
Per Diem (Field Personnel) 29 @ $50 (full day)		1450
Field Vehicle Rental		1610
Lease of Logger		2430
Rental of Gravimeter		1200
Computer		2100
Seismograph		600
Resistivity Meter, Rental		3000
Cables, Explosives and Detonators		1881
Operating Supplies		200
Air Freight		300
	ODC Total	$16051
	Total	$27734

*Rate reflects escalation as of December 1, 1981

3.1 B. Site Clearance

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
K. Kilty	160	16.10	2576
K. Blose	15	12.50	188
K. Knirsch	35	12.50	438
R. Ragland	40	6.67	267
		Labor Total	$3469

Other Direct Costs			
Computer			500
		ODC Total	500
		Total	$3969

*Rate reflects escalation December 1, 1981

3.1 C. Management - Geophysical Investigation

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
R. Stollar	16	25.60	409
E. Lappala	40	22.65	906
		Labor Total	$1315

*Rate reflects escalation December 1, 1981.

PHASE II -- SOURCE AND INSTALLATION BOUNDARY EXIT DEFINITION

WORK ELEMENT 3.0 -- GEOTECHNICAL PROGRAM

3.2 Drilling Program

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
R. Stollar	100	25.60	2560
E. Lappala	200	22.65	4530
A. Snarp	40	17.97	719
K. Blose	574	12.50	7175
K. Knirsch	680	12.50	8500
M. Hume	574	9.76	5602
Technician	320	5.00	1600
		Labor Total	$30686

Other Direct Costs

Airfare	
17 RT - LAX to Salt Lake City @ $320	5440
Lodgings - 18 @$45	810
Subsistence - 18 days @$40 (full day)	720
16 days @ $20 (half day)	320
Vehicle - 10 days @$100	1000
Parking/Mileage	166
Per Diem (Field Personnel) 154 @ $50 (full day)	7700
20 @ $25 (half day)	500
Field Vehicle Rental	9392
Gasoline	1482
Surveyor (Subcontractor)	7250

*Rate reflects escalation as of December 1, 1981.

Driller (Subcontractor)		160050
Threaded PVC		36230
Drilling Mud		3486
Pipe		840
Gravel		9280
Cement		6980
Locks		137
Paint		81
Wood, 4 x 4		582
Barbed Wire		135
Testing, Atterberg & grain size		1280
	ODC Total	$253861
	Total	$284547

PHASE II -- SOURCE AND INSTALLATION BOUNDARY EXIT DEFINITION

WORK ELEMENT 4.0 -- SAMPLING PROGRAM

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
R. Stollar	10	25.60	256
E. Lappala	27	22.65	611
A. Sharp	16	17.97	288
K. Blose	241	12.50	3013
K. Knirsch	241	12.50	3013
		Labor Total	$7181

Other Direct Costs		
Airfare		
5 RT - LAX to Salt Lake City @ $320		1600
Lodgings - 3 @ $45		135
Subsistence 3 days @ $40 (full day)		120
2 days @ $20 (half day)		40
Vehicle 3 days @ $100		300
Parking/Mileage		59
Per Diem (Field Personnel)		
50 @ $50		2500
8 @ $25		200
Field Vehicle		2233
Gasoline		545
Sampling Bottles		570
Generator, Rental		1800
	ODC Total	10102
	Total	17283

*Rates reflect escalation as of December 1, 1981.

PHASE II -- SOURCE AND INSTALLATION BOUNDARY EXIT DEFINITION

WORK ELEMENT 5.0 -- CHEMICAL ANALYSIS

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
R. Stollar	10	25.60	256
E. Lappala	27	22.65	611
		Labor Total	$867

Other Direct Costs

Laboratory Services*		
UBTL (See Exhibit IV)		142468
	ODC Total	142468
	Total	$143335

*Rate reflects escalation as of December 1, 1981.

*See Exhibit V, page 33, for Water Sample Option Costing.

PHASE II -- SOURCE AND INSTALLATION BOUNDARY EXIT DEFINITION

WORK ELEMENT 6.0 -- DATA MANAGEMENT PROGRAM

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
Project-Computer Analyst	37	14.23	527
Staff-Computer Analyst	125	10.26	1283
		Labor Total	$1810

ꝚK ELEMENT 7.0 -- CONTAMINANT ASSESSMENT

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
R. Stollar	125	25.60	3200
E. Lappala	174	22.65	3941
D. Gregg	4	31.36	125
J. Tracy	4	25.39	102
R. Jones	4	15.20	61
K. Blose	209	12.50	2613
K. Knirsch	139	12.50	1738
Staff Geologist	139	11.11	1544
Graphics	100	7.55	755
Typing	80	8.79	703
		Labor Total	$ 14782

* Rate reflects escalation as of December 1, 1981.

Other Direct Costs		
Airfare		
3 RT - LAX to Baltimore @ $878		2634
Car Rental - 2 days @ $100		200
Lodgings - 6 days @ $45		270
Subsistence - 12 @ $40		480
Mileage/Parking		57
	ODC Total	$3641
	Total	$18423

Project Administration

Direct Labor	Estimated Man Hours	Rate*	Estimated Costs
S. Fowler	400	12.17	4868
		Labor Total	$4868

Other Direct Costs		
Office and Field Supplies		1000
Telephone/Telex		1500
Freight/Shipping		1000
Xeroxing		1000
	ODC Total	$4500
	Total	$9368

*Rate reflects average of this classification, escalated as of December 1, 1981.

EXHIBIT IV

Timephased Cost Per Work Element

TOOELE ..Y DEPOT

PHASE I	Hrs.	1981 October	Hrs.	November	Hrs.	December	Hrs.	1982 January	Hrs.	February	Hrs.	March	Hrs.	Total
Element 1.0 - A														
Labor - R. Stollar	32	$ 776											32	$ 776
E. Lappala	32	677											32	677
Labor Total	64	$ 1,453											64	$ 1,453
ODC Airfare		1,756												1,756
Vehicle		40												40
Lodgings		160												160
Subsistence		160												160
Mileage/Parking		22												22
ODC Total		2,138												2,138
Element Total		3,591												3,591
Element 1.0 - B														
Labor - R. Stollar	16	$ 388											16	388
E. Lappala	24	508											24	508
K. Blose	40	444											40	444
Labor Total	80	$ 1,340											80	$ 1,340
ODC Airfare		540												540
Car		100												100
Lodging		200												200
Per Diem		440												440
Mileage/Parking		19												19
ODC Total		$ 1,299												$ 1,299
Element Total		2,639												2,639
Element 1.0 - C														
Labor - R. Stollar	8	$ 194											8	$ 194
E. Lappala	16	338											16	338
K. Knirsch	40	444											40	444
K. Blose	40	444											40	444
Labor Total	104	$ 1,420											104	$ 1,420

TOOEL. .. Y DEPOT

PHASE I (Cont.)	Hrs.	1981 October	Hrs.	November	Hrs.	December	Hrs.	1982 January	Hrs.	February	Hrs.	March	Hrs.	Total
Element 2.0														
Labor - R. Stollar	8	$ 194											8	$ 194
E. Lappala	8	169											8	169
K. Blose	40	444											40	444
Labor Total	56	$ 807											56	$ 807
Element Total	56	$ 807											56	$ 807
Element 3.0														
Labor - R. Stollar	88	$ 2,123											88	$2,123
E. Lappala	96	2,059											96	2,059
D. Gregg	4	119											4	119
J. Tracy	4	97											4	97
R. Jones	16	200											16	200
K. Blose	120	1,333											120	1,333
K. Knirsch	80	889											80	889
S. Fowler	96	1,099											96	1,099
Graphics	40	286											40	286
Technical Typing	20	166											20	166
Labor Total	564	$ 8,371											564	$8,371
ODC Airfare		640												640
Lodging		180												180
Subsistence		240												240
Mileage/Parking		44												44
ODC Total		$ 1,104												$1,104
Element Total		$ 9,475												$9,475

TOOE. .MY DEPOT

PHASE II	1981 October	Hrs.	November	Hrs.	December	Hrs.	1982 January	Hrs.	February	Hrs.	March	Hrs.	Total
Element 1.0													
Labor - R. Stollar		4	$ 97									4	$ 97
E. Lappala		8	172									8	172
K. Blose		20	222									20	222
Labor Total		32	491									32	491
Element Total		32	$ 491									32	$ 491
Element 2.0													
Labor - R. Stollar		4	$ 97									4	$ 97
E. Lappala		4	85									4	85
A. Sharp		8	137									8	137
Labor Total		16	319									16	319
Element Total		16	$ 319									16	$ 319
Element 3.1-A													
Labor - Senior Geophysicist				61	$ 1,349	20	$ 443					81	$ 1,792
Project Geophysicist				159	2,506	53	835					212	3,341
Senior Technician Analyst				177	2,414	59	805					236	3,219
				219	1,857	73	619					292	2,476
Cartographer				27	204	9	68					36	272
Technical Typing				14	123	4	35					18	158
Technician				64	320	21	105					85	425
Labor Total				721	$ 8,773	239	$2,910					960	$11,683
ODC Lease of Logger					1,822		$ 608						$ 2,430
Per Diem					1,088		362						1,450
Vehicle Rental					1,208		402						1,610
Airfare					960		320						1,280
Computer					1,575		525						2,100
Gravimeter Rental					900		300						1,200
Seismograph					450		150						600
Cables, Explosives Detonators					1,411		470						1,881
Resistivity Meter					2,250		750						3,000
Operating Supplies					150		50						200
Air Freight					225		75						300
ODC Total					12,039		4,012						16,051
Element Total					$ 20,812		$6,922						$27,734

TOOELE ARMY DEPOT

PHASE II Cont	1981 October	Hrs.	November	Hrs.	December	Hrs.	1982 January	Hrs.	February	Hrs.	March	Hrs.	Total
Element 3.1-B													
Labor - K.Kilty				120	$ 1,932	40	$ 644					160	$ 2,576
K. Blose				11	141	4	47					15	188
K. Knirsch				26	328	9	110					35	438
R. Ragland				30	200	10	67					40	267
Labor Total				187	2,601	63	868					250	3,469
ODC Computer					375		125						500
ODC Total					375		125						500
Element Total				187	2,976	63	993					250	3,969
Element 3.1-C													
Labor - R. Stollar		12	$ 307	4	$ 102							16	$ 409
E. Lappala		30	680	10	226							40	906
Labor Total		42	987	14	328							56	$1,315
Element Total		42	$ 987	14	$ 328							56	$1,315
Element 3.2													
Labor - R. Stollar				56	$1,434	22	$ 563	22	$ 563			100	$ 2,560
E. Lappala				60	1,358	70	1,586	70	1,586			200	4,530
A. Sharp				24	431	16	288					40	719
K. Blose				106	1,325	318	3,975	150	1,875			574	7,175
K. Knirsch				212	2,650	318	3,975	150	1,875			680	8,500
M. Hume				106	1,035	318	3,104	150	1,463			574	5,602
Technician				80	400	184	920	56	280			320	1,600
Total Labor				644	$8,633	1246	$14,411	598	$7,642			2488	$30,686

TOOELE ARMY DEPOT

PHASE II (Cont)

		1981 October	Hrs.	November	Hrs.	December	Hrs.	1982 January	Hrs.	February	Hrs.	March	Hrs.	Total Cost
ODC -	Airfare					$ 2,880		$ 2,240		$ 320				$ 5,440
	Lodging					540		180		90				810
	Subsistence					640		240		160				1,040
	Car Rental					600		200		200				1,000
	Parking/Mileage					100		44		22				166
	Per Diem					1,900		4,050		2,250				8,200
	Field Vehicle Rental					2,901		3,351		3,140				9,392
	Gasoline					244		816		422				1,482
	Surveyor-Sub					4,984		2,266						7,250
	Driller-Sub					30,600		116,400		13,050				160,050
	Threaded PVC					26,086		10,144						36,230
	Drilling Mud					3,486								3,486
	Pipe					840								840
	Gravel					9,280								9,280
	Cement					6,980								6,980
	Locks					137								137
	Paint					81								81
	Wood					582								582
	Wire					135								135
	Testing					1,280								1,280
	ODC Total					$ 94,276		$139,931		$19,654				$253,861
	Element Total				644	$102,909	1246	$154,342	598	$27,296			2488	$284,547

TOOELE DEPOT

PHASE II (cont)

	1981 October	Hrs.	November	Hrs.	December	Hrs.	1982 January	Hrs.	February	Hrs.	March	Hrs.	Total
Element 4.0													
Labor - R. Stollar								10	$ 256			10	$ 256
E. Lappala						13	$ 294	14	317			27	611
A. Sharp						16	288					16	288
K. Blose						45	563	80	1,000	116	$ 1,450	241	3,013
K. Knirsch						45	563	80	1,000	116	1,450	241	3,013
Labor Total						119	1,708	184	2,573	232	2,900	535	7,181
ODC - Airfare									960		640		1,600
Lodgings									135				135
Subsistence									160				160
Vehicle									300				300
Parking/Mileage									39		20		59
Per Diem							500		900		1,300		2,700
Field Vehicle Rental							708		684		841		2,233
Gasoline							94		188		263		545
Generator Rental							428		645		727		1,800
Sample Bottles							570						570
ODC Total							2,300		4,011		3,791		10,102
Element Total						119	4,008	184	6,584	232	6,691	535	17,283
Element 5.0													
Labor - R. Stollar								10	256			10	256
E. Lappala						13	294	14	317			27	611
Labor Total						13	294	24	573			37	867
ODC Lab (UBTL)			$28,494		$21,370		31,343		41,316		19,945		142,468
ODC Total			28,494		21,370		31,343		41,316		19,945		142,468
Element Total			$28,494		$21,370	13	$31,637	14	$41,889		$19,945	37	143,335

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PHASE (cont)	October	Hrs.	November	Hrs.	Decem	cs.	January	Hrs.	February	Hrs.	March	Hrs	1
Element 6.0													
Labor - Computer - Project						18	$ 257	19	$ 270			37	$ 527
Computer - Staff						63	647	62	636			125	1,283
Labor Total						81	903	81	906			162	1,810
Element Total						81	903	81	906			162	1,810
Element 7.0													
Labor - D. Gregg										4	$ 125	4	125
J. Tracy										4	102	4	102
R. Jones										4	61	4	61
R. Stollar										125	3,200	125	3,200
E. Lappala										174	3,941	174	3,941
K. Blose										209	2,613	209	2,613
K. Knirsch										139	1,738	139	1,738
Staff Geologist										139	1,544	139	1,544
Graphics										100	755	100	755
Technical Typing										80	703	80	703
Labor Total										978	14,782	978	14,782
ODC - Airfare											2,634		2,634
Vehicle											200		200
Lodgings											270		270
Subsistence											480		480
Mileage/Parking											57		57
ODC Total											3,641		3,641
Element Total										978	18,423	978	18,423

TOOELE DEPOT

Project Administration		1981 October	Hrs.	November	Hrs.	December	Hrs.	1982 January	Hrs.	February	Hrs.	March	Hrs.	Total
Labor - S. Fowler	45	$526	63	$ 736	93	$ 1,148	73	$ 902	63	$ 778	63	$ 778	400	$ 4,868
Labor Total	45	526	63	736	93	1,148	73	902	63	778	63	778	400	4,868
ODC - Office/Field Supplies		166		167		166		167		166		167		1,000
Telephone/ Telex		250		250		250		250		250		250		1,500
Freight/ Shipping		167		167		167		167		167		165		1,000
Xeroxing		167		167		167		167		167		165		1,000
ODC Total		750		751		751		751		750		747		4,500
Element Total	45	$1,276	63	$1,487	93	$ 1,899	73	$1,653	63	$1,528	63	$1,525	400	$ 9,368
Project Totals														
Labor		5,546		10,904		21,484		21,996		12,472		18,460		90,862
ODC		4,187		30,349		128,811		178,462		65,731		28,124		435,664
TOTAL		9,733		41,253		150,295		200,458		78,203		46,584		526,526

EXHIBIT V

Laboratory Subcontractor

	Chemical Analysis		Quality Assurance		
	Hours	Amount	Hours	Amount	Total Amount
Labor*					
Analytical Chemist (YHY)	44	439			
Analytical Chemist (DEJ)	28	219			
Analytical Chemist (SRB)	28	315			
Analytical Chemist (ABT)	119	1,152			
Analytical Chemist (KN)	81	881			
Analytical Chemist (CLM)	100	807			
Analytical Chemist (BLA)	46	455			
Analytical Chemist (JM)	46	309			
Analytical Chemist (RMI)	94	749			
Analytical Chemist (JMR)	260	3,107			
Analytical Chemist (RWW)	21	217			
Analytical Chemist (RW)	18	166			
Assoc. Technician (JRB)	563	3,637			
Assoc. Technidian (TBI**)	563	3,637			
Assoc. Technician (TBI**)	287	1,854			
Analytical Chemist (JCH)			80	867	
Analytical Chemist (GSB)			100	1138	
Quality Control Tech. (TBI**)			211	1055	
Analytical Chemist (DA)	55	338			
		18,282		3,060	21,342
Employee Benefits (41.2%)		7,532		1,261	8,793
Supplies					
Chromatographic Columns for Sample Analysis		1,000			
Misc Supplies (solvents, gases, chart paper, etc.)		3,170			
Shipment of Samples for Radioactivity Analysis		175			
Sampling containers		726			
5 intermediate reference standards				150	
Misc Supplies for Method Development (chart paper, solvents, gases, etc)				800	
		5,071		950	6,021
Purchased Services					
ICP Analysis by Earth Science		2,357			
Radioactivity Analysis by CEP, Inc.		3,542			
NMR and Elemental Analysis for Characterization of IRM's				300	
		5,899		300	6,199
Equipment Usage					
Dionex Model 10 IC	323	1,454			
PE 5000 HGA	111	700			
PE 305A	44	100			
HPLC Spectra Physics	152	380			
GC/MS 5985, 5992	490	22,050			
		24,684			24,684
Travel					
Ground Transportation to Tooele, Utah for delivery and pickup of sample containers 40 trips @ 85 miles/trip @ $.20/mile		680			680
Trip to Edgewood for 4 days:					
Air Transportation 1 x $620	620				
Ground Trans. 4days x $50	200				
$10 parking	10				
Per Diem & Lodging: $90 x 4 days	360				
	1190	1,190			1,190
		1,870			1,870
Indirect Costs-Laboratory (80% Provisional)		50,671		4,457	55,128
General and Administration (12% Provisional)		7,601		669	8,270
Total Direct and Indirect Costs		121,610		10,697	132,307
Fee		8,513		749	9,262
Total Costs		$130,123		$11,446	$141,569

*Management personnel costs are indirect
**To Be Indicated

EXHIBIT VI

Water Sample Option

Laboratory Subcontractor

	Hours	Amount
AA Metals (KN)	8	$ 87
Mercury (CLM)	10	81
Anions (BLA)	5	50
Cations (JM)	5	34
HPLC (RMI)	12	96
GC/MS (JMR)	49	586
Assoc. Tech. (JRB)	52	336
QC Tech. (TBI)	20	130
Oil & Grease (DA)	14	86
Cyanide (ABT)	23	223
		1,709
Employee Benefits		704
Supplies		
Misc. Supplies	293	
Ship for Radio Act.	22	
Sample containers	67	
	382	382
Purchased Services		
ICP Analysis	289	
Radio Activity Analysis	348	
	637	637
Equipment Usage		
Dionex Model 10 IC	68	
PE 5000 HGA	70	
PE 305A	10	
HPLC Spectra Physics	48	
GC/MS 5985-5992	2385	
	2581	2,581
Travel		
Ground transportation to Tooele, Utah for delivery and pickup of Sample Containers: 4 trips @ 85 miles per trip - 20¢/mile		68
		6,081
Indirect Costs - Laboratory (80% Provisional)		4,865
General & Administrative (12% Provisional)		730
		11,676
Fee		817
TOTAL COSTS		$12,493